GRADE 1 MATHEMATICS

Number

Grade 1: Number (1.N.1, 1.N.3)

Enduring Understanding:

Counting is a strategy for finding the answer to how many.

Essential Question:

Is there a quicker way to find the answer than counting by ones from one?

General Outcome:

Develop number sense.

Specific Learning Outcome(s):	Achievement Indicators:
1.N.1 Say the number sequence by ■ 1s forward and backward between any two given numbers (0 to 100) ■ 2s to 30, forward starting at 0 ■ 5s and 10s to 100, forward starting at 0 [C, CN, ME, V]	➛ Recite forward by 1s the number sequence between two given numbers (0 to 100). ➛ Recite backward by 1s the number sequence between two given numbers. ➛ Record a numeral (0 to 100) symbolically when it is presented orally. ➛ Read a numeral (0 to 100) when it is presented symbolically. ➛ Skip-count by 2s to 30 starting at 0. ➛ Skip-count by 5s to 100 starting at 0. ➛ Skip-count by 10s to 100 starting at 0. ➛ Identify and correct errors and omissions in a number sequence
1.N.3 Demonstrate an understanding of counting by ■ using the counting-on strategy ■ using parts or equal groups to count sets [C, CN, ME, R, V]	(It is intended that the sets be limited to less than 30 objects and that students count on from multiples of 2, 5, and 10 respectively.) ➛ Determine the total number of objects in a set, starting from a known quantity and counting on by 1s. ➛ Count number of objects in a set using groups of 2s, 5s, or 10s. ➛ Count the total number of objects in a set, starting from a known quantity and counting on by using groups of 2s, 5s, or 10s.

Prior Knowledge

Students may have had experience

- saying the number sequence by 1s, starting anywhere from 1 to 30 and from 10 to 1
- demonstrating an understanding of counting to 10 by indicating that the last number said identifies "how many"
- showing that any set has only one count

Background Information

Stages of Counting

Rote Counting (Ages 2 to 6): Most preschool children learn some counting words, even though they may not say these words in the correct order.

With experience they learn the proper sequence (stable order) but may be unable to make one-to-one correspondence between the object being counted and the number names that are applied to them.

Rational Counting (Ages 5 to 7): The students attach the correct number name to each object as it is counted (one-to-one correspondence).

The students understand that the final count number indicates the number of objects in a set (cardinality).

Strategic Counting (Ages 5 to 8): Counting on and counting back are two strategies that extend students' understanding of numbers and provide a basis for later development of addition and subtraction concepts.

In counting on, the students count forwards beginning at any number. Counting back is challenging for many young students, and students need many opportunities to gain skill and confidence in counting backwards from different numbers.

Counting Principles

The research related to how children learn to count identifies principles which children need to acquire to become proficient at counting. They include

Stable Order: Words used in counting must be the same sequence of words used from one count to the next.

Order Irrelevance: The order in which objects are counted doesn't matter. Counting things in a different order still gives the same count.

Conservation: The count for a set of objects stays the same whether the objects are spread out or close together. The only way the count can change is when objects are added to the set or removed from the set.

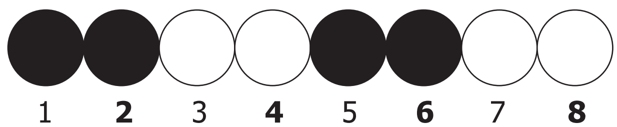
Abstraction: Different things can be counted and still give the same count. Things that are the same, different, or imaginary (ideas) can be counted.

One-to-one Correspondence: Each object being counted is given one count in the counting sequence.

Cardinality: After a set of objects has been counted, the last number counted represents the number of objects in that set. If students need to recount they don't understand the principle.

It is important that students realize that skip-counting sequences relate to putting groups of the same number together.

Example of counting by 2s



Therefore the count is: 2, 4, 6, 8 …

MATHEMATICAL LANGUAGE

counting numbers: one to one hundred

count on

skip count

set

number

numeral

Assessing Prior Knowledge

Rote counting: Ask the students to

- start at 1 and count forward, stop at 32
- start at 15, stop at 24
- start at 14 and count backward, stop at 8
- start at 22 and count backward, stop at 12

Math Routine:
Counting should be done for a short period of time every day.

Place seven to ten objects in a line on a table. Have the students count them. Observe the students as they count.

Do the students

- touch or move the objects as they say the number word?
- count each object once only?
- say the number sequence correctly?

Ask: "How many objects are there?" Do the students reply without having to recount?

Point to an object located near the middle of the set. Ask: "How many objects will there be if you start counting here?" Do the students count on to the end of the row and ignore the objects at the beginning or do they reply immediately with the actual count or recount all objects?

Have students spread the objects out on the table. Ask: "Now how many objects are there?" Do the students reply without having to recount?

- **Recite forward and backward by 1s the number sequence between two given numbers (0 to 100).**

- Provide many opportunities for students to practise counting using a variety of concrete sets of objects, as well as pictures of sets.
- Use songs, poems, finger plays, and children's literature to support increasing and decreasing counting sequences.
- Relate each decade to a tone or action such as the spooky teens (said in a spooky voice), the wiggly twenties (wiggle fingers), for rote counting forward.

BLM 1.N.1&3.1

- Pocket Chart Counting: Place the digits 0 to 9 vertically in the pocket chart with 9 at the top and 0 at the bottom. Using a set of multiples of ten cards, have students count while the teacher places the appropriate ten cards behind the digit cards to make the number. For example, the 10 card will be placed behind the 1 to make the number 11 then moved to the 2 to make 12, etc.

BLM 1.N.1&3.2

- Place number cards 1 to 100 (modify to meet the needs of students) in a container. Have a student select two cards. The class/small group/individual starts counting with the first number selected and stops when they get to the second number drawn.

Observation Checklist

Students are able to

❑ confidently count forward by 1s from random starting points in the range

  ______ within decades

  ______ between decades

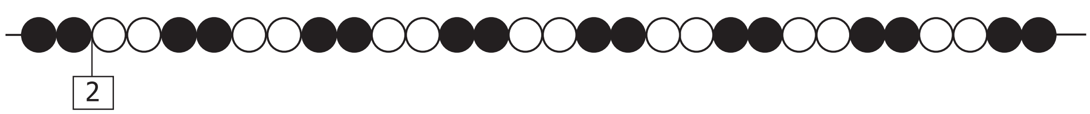
❑ confidently count backward by 1s from random starting points in the range

  ______ within decades

  ______ between decades

- **Skip-count by 2s (to 30), 5s, and 10s (to 100) starting at 0.**

- **Beaded Number Line:** Use a beaded number line grouped in 2s to 30 to help students visualize the skip counting.



Use beaded number lines grouped in 5s and 10s to 100 to support skip counting by 5s and 10s.

Note: Bread tags with numbers written on them can be clipped to the bead line to show the counting sequence.

- **Whisper count:** Have students whisper odd numbers and say the multiples of two out loud in order to count by 2s (1, **2**, 3, **4**, 5, **6**, …).
- **Listen and Count:** Drop pennies into a tin can. Students listen and count, then give the total. Drop nickels and have students count by 5s. Drop dimes for counting by 10s.
- Have students solve oral problems such as, "How many eyes (ears, hands, fingers, toes, etc.) are in our classroom/group?" using skip counting.
- **Frog Jump:** Use a horizontal number line/ large floor chart with numerals well spaced or number 'stepping stones'. Have students jump on multiples of 2 or step on multiples of 5 as they skip count orally.
- Students skip count on a hundred (1 to 30, 1 to 50) chart (see below) and colour the patterns according to their skip count.

Before using the hundred chart, students should have an opportunity to see how it has been constructed. Start with a horizontal number line built in sections of ten. Show students how these move together to make the chart (1 to 30, 1 to 50, or 1 to 100).

BLM
1.N.1&3.3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

10	20	30	40	50	60	70	80	90	100
9	19	29	39	49	59	69	79	89	99
8	18	28	38	48	58	68	78	88	98
7	17	27	37	47	57	67	77	87	97
6	16	26	36	46	56	66	76	86	96
5	15	25	35	45	55	65	75	85	95
4	14	24	34	44	54	64	74	84	94
3	13	23	33	43	53	63	73	83	93
2	12	22	32	42	52	62	72	82	92
1	11	21	31	41	51	61	71	81	91

Observation Checklist

Students are able to

- ❑ orally count by

  2s to 20 or to ________

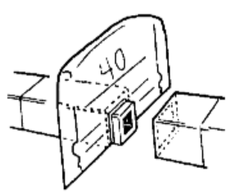
  5s to 100 or to ________

  10s to 100 or to ________

- **Count number of objects in set using groups of 2s, 5s, or 10s.**

- Teacher displays a large set of counters. Then asks, "How many counters do you think there are? Count them. Count by 2s. Organize them and count them by 5s.
- Teacher tells students, "Count the beads by 2s to make a set of 24."
- Teacher tells students, "Count the marbles by 5s to make a set of 35."
- With five students, make a *One Hundred Train*. Each student chooses two different colours of interlocking cubes and makes two segments of 10 (each one a different colour). Compare the segments to see that they are all equal. Practise counting them by 10s to 100. Make train cards, with small squares cut out of the bottom to fit over the joiners between the 10s. These will remain standing when the *One Hundred Train* is completely joined. Assist the students to print the numbers 10, 20, et cetera, on the cards and then colour them to look like a train. Make the engine for the front and assemble. Leave the train in the math centre for some time to allow the students to take it apart and use it like a puzzle. Students can make permanent trains on paper by colouring strips of squares to match the cubes.

> Students may count the objects by 2s or 5s but remove or touch only one object at a time. These students see skip counting as a rote exercise only and are not yet thinking in groups.



Journal/Learning-Log Entry

In your journal, use pictures and words to explain how to count a set of 17 counters by 2s.

- **Determine the total number of objects in a set, starting from a known quantity and counting on by 1s.**

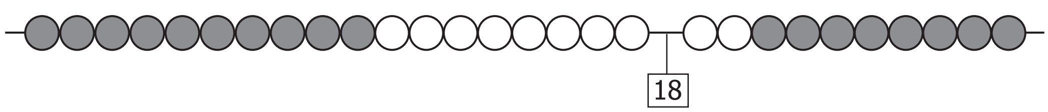
- **Counting On Jar:** Use a transparent container. Students count as the teacher drops counters into the jar. Make sure that all students agree with the total. Seal the container. Use the container along with additional counters and have students count on to find different totals.

- Use one regular 1 to 6 die with pips and one die with the numerals 1 to 6. Students roll the two dice, say the numeral shown and then count on using the dots/pips (the "spots" on a dice, playing card, or domino) on the regular die. **Note:** This will give practise with counting on but will not address selecting the largest number and counting on.

- Teacher says, "I have a set of 27. Finish the counting so the set will equal 35."

- Teacher tells students, "Here are 63 pennies. Count in more pennies until there are 80."

- Use a beaded number line. Have students count in their heads as beads are moved one at a time. Establish how many beads have been moved. Place a label with the numeral after the number of beads counted.



Now start from the label and move one bead at a time while students count on out loud.

Observation Checklist

Students are able to

- ❑ count on from a known quantity to find the total
- ❑ count both sets individually and then go back to the beginning and count all

- **Identify and correct errors and omissions in a number sequence.**

- Orally present a short number sequence with either omissions or errors (or both). Have students identify the errors or omissions and make appropriate corrections
- Materials: cards made with skip counting by 1s, 2s, 5s, and 10s.
  - Shuffle one set (count by 2s) and have student(s) order them in counting sequence.
  - Place the cards in sequence face up. Ask students to look away while teacher removes several cards. Students identify the missing numbers. Ask students to explain how they know.
  - Place the cards in a sequence that contains errors. Students identify errors and make appropriate corrections.

- **Read a numeral when it is presented symbolically and record a numeral symbolically when it is presented orally (0 to 100).**

- Have students sit in a circle. Place a set of number cards (within a range suited to the needs of the students) face down and in random order. Students take turns picking a card and reading the number aloud.
- Prepare a class/small group set of 'I Have… Who has…?' number cards (within a range suited to the needs of the students).

  Pass the cards out in random order. Select a student to read his or her card. Have the other students listen for the question to which they have the answer on their card. If they have the answer, they read their card. Play continues in this manner until returning to the start card.

  Example:

BLM
1.N.1&3.4

I have 22.	I have 38.
Who has 38?	Who has 17?

The recording of numerals should take place in meaningful contexts rather than through repetitive printing of numerals themselves.

- **Purpose:** Recording numerals

  Materials: set of number cards

  Directions: Have students work in pairs. Place the number cards face down. The first student draws a card making sure not to show it to his or her partner and reads the number shown. The partner records the number. The first student checks the written numeral. They then change roles.

Putting the Pieces Together

Investigation: Grade 1 Math Kits

Scenario: Mr./Mrs./Ms. ________ wants to make 8 (12) math kits for small group work. He or she wants each kit to have:

- 10 cubes
- 2 dice
- 5 beans

(Vary the items based on materials available.)

He or she wants to know how many of each item he or she will need

Have students work in partners.

Note: Groups can be working on one item or on all three depending on their level of readiness.

Provide each group with a large piece of paper and a marker. Allow them the freedom to try to solve the problem. Scaffold the task, if necessary, while students are working on the investigation (not before).

Select a variety of solutions to have students share in a whole-class meeting.

Grade 1: Number (1.N.2)

Enduring Understanding:

The quantity of a small collection can often be determined through instant recognition or by thinking of it in its parts.

Essential Questions:

How many dots/objects do you see?
How do you see them?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
1.N.2 Subitize and name familiar arrangements of 1 to 10 dots (or objects). [C, CN, ME, V]	➛ Look briefly at a familiar dice arrangement of 1 to 6 dots, and identify the number represented without counting. ➛ Look briefly at a familiar ten-frame arrangement of 1 to 10 dots (or objects), and identify the number represented without counting. ➛ Look briefly at a finger arrangement, and identify how many fingers there are without counting. ➛ Identify the number represented by an arrangement of dots (or objects) on a ten frame, and describe the number's relationship to 5 and to 10.

PRIOR KNOWLEDGE

Students may have had experience

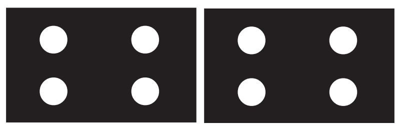
- subitizing and naming familiar (regular) arrangements of 1 to 6 dots/objects
- working with five frames to explore the relationship of a number to 5
- identifying the number represented by a given dot arrangement on a five frame and identifying the numbers that are one more and one less

Background Information

Subitizing is the ability to rapidly determine the quantity of a small group of objects without counting. Subitizing is a fundamental skill in a student's development of number understanding.

BLM 1.N.2.1

There are two types of subitizing; perceptual and conceptual. Perceptual subitizing is the ability to recognize the quantity of a set without counting. It is the basis for counting and cardinality. Conceptual subitizing is seeing number patterns within a set (part—whole) and then determining the quantity by putting the number patterns together . For example, when shown a domino with a pattern of 8 dots/pips the observer may break the 8 dots into two groups of 4 .



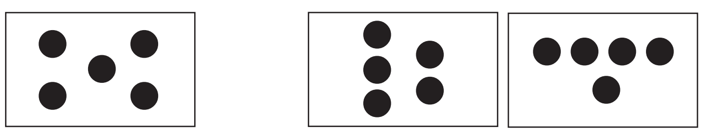
Conceptual subitizing is the basis of number and operation sense.

Dot representations can be regular and irregular. Regular representation show the dots as you would find them on a die or domino. Irregular representations group the dots in a variety of ways.

Examples:

Representations for 5:

BLM 1.N.2.2



Regular Irregular

Using five frames before introducing ten frames helps to develop additive thinking. Students think of numbers as 5 and some more rather than so many less than 10.

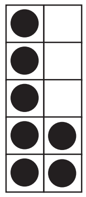
BLM 1.N.2.3

6 is 1 more than 5 8 is 3 more than 5

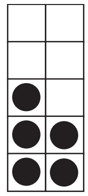
Note: Although groups of outcomes and achievement indicators are dealt with separately, they are all connected.

Ten frames can be filled in two different ways:

BLM 1.N.2.4



Filling the 5 first



Filling pairs

Students should be exposed to both representations.

Mathematical Language

sets

subitizing

"How many"

dots/pips

five frames

ten frames

Learning Experiences

Assessing Prior Knowledge

Observe students as they play a board game with a die. Which numbers do they recognize without counting the pips?

❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5 ❑ 6

As a class or small group flash five-frame representations and have students indicate the number shown with their fingers.

- ❑ Are they correct?
- ❑ Are they confident in their decisions?

Look for evidence of counting such as head bobbing or finger counting.

- **Look briefly at a familiar dice arrangement of 1 to 6 dots, and identify the number represented without counting.**

BLM 1.N.2.5

- **Flash Math:** Prepare a set of dot cards with dot representations to 6. Flash the cards (3 seconds) and have the students record the number of dots seen.

- **Dice Roll:**

  Materials: 1 die, 10 counters

  Directions:

  Have students paired up with a partner.

  Player 1 rolls the die. Both players call out the number shown as quickly as they can. The first player to say the number takes one of the counters. Player 2 then rolls the die.

  Play continues until there are no counters left.

  The player with the greatest number of counters is the winner.

BLM 1.N.2.6

- **Dice and Dominoes!**

  Materials: two (1 to 6) dice, dominoes with totals to 6

  Directions: Place the dominoes face up on the table. Roll the dice. Be the first to find the domino that matches the dice representation. The player with the greatest number of dominoes is the winner.

Observations

Observe students as they play.

Which number representations do they recognize without counting the pips?

❏ 1 ❏ 2 ❏ 3 ❏ 4 ❏ 5 ❏ 6

Have students make their own regular and irregular dot cards/plates for assigned numbers. Ask students to describe how they see their arrangements, for example, "I see 3 dots on one side and 2 on the other and I know that 3 and 2 are 5."

The cards/plates can be placed in a math centre for further practice.

Observation Checklist

Students are able to

❏ make regular and irregular dot cards for a given number

❏ recognize irregular representations for

❏ 1 ❏ 2 ❏ 3 ❏ 4 ❏ 5 ❏ 6

■ **Look briefly at a finger arrangement, and identify how many fingers there are without counting.**

- **Show How Many:** Hold your two hands up showing no fingers at all, then flash a number of fingers (e.g., 7 for about a second—long enough to see, but not to count), then go back to closed fists. Ask students to use their hands to show how many fingers you held up.

BLM 1.N.2.7

- **Who's First?**

  Materials: a double set of finger representations for the numbers 1 to 10

  Directions: Work with a partner. Place the cards in a pile face down. Players take turns turning the top card over. The first person to identify the number shown gets the card. The person with the greatest number of cards is the winner.

Observation Checklist

Students are able to

- ❑ make regular and irregular dot cards for a given number
- ❑ recognize finger patterns for (see BLM 1.N.2.7)

  ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5 ❑ 6 ❑ 7 ❑ 8 ❑ 9 ❑ 10

- **Look briefly at a familiar ten-frame arrangement of 1 to 10 dots (or objects), and identify the number represented without counting.**
- **Identify the number represented by an arrangement of dots (or objects) on a ten frame, and describe the number's relationship to 5 and to 10.**

- **Flash Math:** Prepare a set of ten-frame cards. Flash the cards (2 to 3 seconds) and have the students record the number of dots seen. Ask students to describe what they saw (e.g., "I saw 5 and 2 more and I knew that it was 7." or " I saw that 3 squares were empty and I know that 10 – 3 is 7." or "I saw 3 pairs of 2 and one more and that makes 7.").

- **Dice and Ten Frames!**

  Materials – two (0 to 5) dice and a double set of ten-frame cards

  Directions: Place the ten-frame cards face up on the table. Roll the dice. Be the first to find the ten-frame card that matches the dice representation. The player with the greatest number of cards is the winner.

- **Capture!**

  Materials – a set of ten-frame cards for each student.

  Directions: Players place their ten-frame cards face down in a pile in front of them. On a signal, both players turn over the top card and identify the number shown. The player with the largest (smallest) number keeps the cards. The player with the greatest number of cards at the end is the winner.

Observation Checklist

Students are able to

❏ recognize ten-frame patterns for

❏ 1 ❏ 2 ❏ 3 ❏ 4 ❏ 5 ❏ 6 ❏ 7 ❏ 8 ❏ 9 ❏ 10

Grade 1: Number (1.N.4)

Enduring Understanding:

Quantities can be represented in a variety of ways with objects, pictures, and numerals.

Essential Questions:

How can quantities be shown?
How many different ways can you represent a number?

Specific Learning Outcome(s):	Achievement Indicators:
1.N.4 Represent and describe numbers to 20 concretely, pictorially, and symbolically. [C, CN, V]	➛ Represent a number up to 20 using a variety of manipulatives, including ten frames and base-10 materials. ➛ Read number words to 20. ➛ Partition any quantity up to 20 into two parts, and identify the number of objects in each part. ➛ Represent a number to 20 in two parts, concretely, pictorially and symbolically. ➛ Determine compatible number pairs for 5, 10, and 20. ➛ Model a number using two different objects (e.g., 10 desks represents the same number as 10 pencils). ➛ Place numerals on a horizontal or vertical number line with benchmarks 0, 5, 10, and 20.

Prior Knowledge

Students may have had experience

- representing and describing numbers 2 to 10 in two parts concretely and pictorially
- ordering quantities using objects, five frames, ten frames, or dot cards
- ordering, using at least 2 benchmarks, numerals 1 to 10 on a vertical or horizontal number line
- relating a numeral, 1 to 10, to its respective quantity

Background Information

Part-whole relationships refer to the idea that numbers can be broken down into parts, and that these parts can be compared to the whole. According to John Van de Walle, to conceptualize a number as being made up of two or more parts is the most important relationship that can be developed about numbers.

A pair of numbers that is easy to work with mentally (also known as friendly or nice numbers) are said to be **compatible**.

Example:

$3 + 6 + 7 + 4 =$

$10 + 10 = 20$

When solving this number sentence, it is easier to look for combinations that make 10.

Whenever the sum of any two numbers equals the given number, the two numbers are said to be **complementary** (e.g., 6 and 4 = 10, 1 and 9 = 10, etc.).

Mathematical Language

whole

part

represent

combination(s)

number words one to twenty

number line

ten frames

Assessing Prior Knowledge

Show Yourself!: Say to students "Show yourself seven." Students show seven fingers, palms facing toward themselves. Now ask them to tell how many more to make ten. Repeat using different numbers.

Observe to see which students can show finger patterns without counting. If they do count, do they count from one or (for numbers 6 to 10) do they count on from five?

Hands Up: Have students put their hands by their ears with their fingers pointing up (like a rabbit). Pick a number from 2 to 10 (e.g., 8). Ask students to show the number with their fingers. Talk about the different ways they made the number (e.g., 5 and 3 or 4 and 4). Are there other ways that are not shown?

Observe to determine which students have difficulty showing the number when their fingers are not visible. Are they able to represent the number? Can they describe their representation?

BLM 1.N.2.8

Have students order sets of objects or pictorial (dot cards or five/ten frames) representations (1 to 10) and then place the matching numeral with the representation.

Observe to identify which students can order the representations and match the numeral. Do the students have to count in order to match the numeral or are they using subitizing?

- **Represent a number up to 20 using a variety of manipulatives, including ten frames and base-10 materials.**
- **Model a number using two different objects (e.g., 10 desks represents the same number as 10 pencils).**

- **Show Off!:** Have students work in groups of two. Each team picks a number between 11 and 20. They then work together to decide how they will show the class their number using their fingers (e.g., for the number 14—one student could show ten fingers and the other student four or both students could show seven, etc.). Groups take turns showing their representation to the class briefly and then having the number identified.

  Extension: Have the representations made using ten frames in place of fingers.

> **Note:** Base-10 materials can be various types of interlocking cubes, craft sticks and elastics, straws, etc. The term does not relate specifically to the commecially made base-10 materials.

BLM 1.N.4.1

- **Flash and Build Five/Ten!** (source Manitoba Education Math website)

  Materials: counters, five/ten frame cards, five/ten frame game board

  Directions: Students play in pairs. Place a set of five- or ten-frame cards face down in a pile. The first player flashes a card to his or her partner. The second player identifies the number shown and builds it on his or her game board. They then check to see if they are correct and then change roles.

  Vary the game by having the players say the number shown without having to make the representation.
  Have students make the five/ten frame game cards.

- Provide multiple opportunities for students to represent numbers in meaningful contexts (e.g., cubes/clothes pins to show the number of students present/absent, use tallies to record a class vote, food items ordered for a special lunch day, etc.).

Observation Checklist

Students are able to:

- ❑ represent numbers 0 to 10 using a variety of materials
- ❑ represent numbers 11 to 20 using a variety of materials

- **Read number words to 20.**

BLM 1.N.4.2

- Students use cards with numerals and number words to play board games such as Concentration/Memory, Lotto.
- Have students write story problems using number words. The problems can be made into a class book for others to solve.
- **Scavenger Hunt:** Have students look through magazines, flyers, and newspapers to try and find numerals and number words for the numbers 1 to 20. (**Note:** This could be an activity that students do at home with parent support.)
- Read and discuss poems and stories containing number words.
- Students can make their own picture books using numerals, number words and pictures of sets.

Observation Checklist

Place cards with the number words to 20 in a container. Have students take turns drawing a card and reading the word.

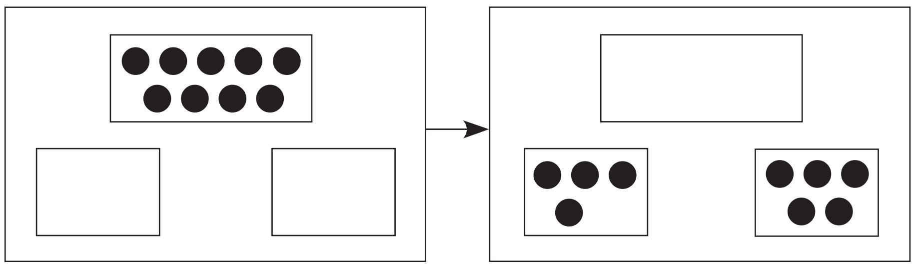
BLM 1.N.4.3

	One	Two	Three	Four	Five	Six	Seven	...Twenty
Student 1								
Student 2								

- **Partition any quantity up to 20 into two parts, and identify the number of objects in each part.**
- **Represent a number to 20 in two parts, concretely, pictorially, and symbolically.**
- **Determine compatible number pairs for 5, 10, and 20.**

BLM 1.N.4.4

- **Part-Whole Board:** Have students use a part-whole board and a given number of counters. Place their counters in the large rectangle. Have them partition the counters into the smaller rectangles. Ask students to tell how they made the number, for example, "How did you make 9?" Student answers, "Nine is 4 and 5."

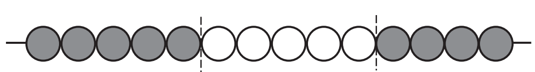


BLM 1.N.4.5

- **Dominoes:** Use a set of double six dominoes. Students work with a partner to sort the dominoes finding all the representations for the numbers 0 to 12 and record their results. Extension: Use a set of double nine dominoes for representations to 18.

- **Twenty bead measures:** Have students make their own twenty bead measure using two contrasting colours of beads. The bead measure can be used to partition numbers while reinforcing relationships to five and ten.

Use the bead measure to show 14.



Some students will see 14 as two 5s and 4 more.

Some students will see 14 as 10 and 4 more.

- **Shake, Spill, and Record:** Use two-colour counters or lima beans that have been spray painted on one side. Students shake a set of counters and then spill them onto the table. They record the number of each colour shown. Continue until all combinations have been made.

- Provide many opportunities for problem solving (e.g., The pet store has 16 fish and two aquariums. How can the fish be shared between the two aquariums? Show as many different ways as you can.).

- **Five and Ten Frames:** Work with five and ten frames. Show students a frame and ask "How many dots do you see?" "How many more to make five/ten?" "How do you know?" Extend to double ten frames for numbers 11 to 20.

- **I say… You say…:** A target number is selected. The teacher or student leader gives a number less than the target number and the students reply with the number needed to make the target number (e.g., Target number is 20. The teacher says, "I say 11." Students reply saying, "We say 9.").

- **How many more…? game:**

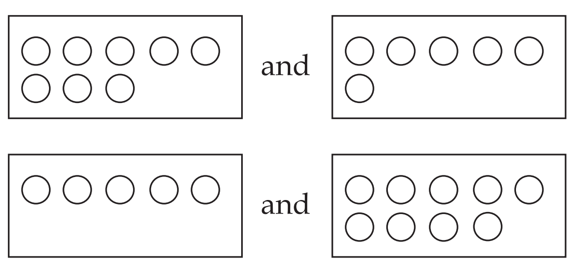
  Materials: game grid for each student, game markers, number cards

  BLM 1.N.4.6

  Directions: Decide on a target number. Have students write numbers between 0 and the target number anywhere on their grid. Numbers can be repeated. The teacher/leader draws a number card and calls it out. Students cover the compatible/complementary number on their game board. The first player to get three or four in a row is the winner.

Paper-and-Pencil Tasks

1. "Draw a picture to show 18 in three different ways."
2. "Tell what number this represents."



- **Place numerals on a horizontal or vertical number line with benchmarks 0, 5, 10, and 20.**

BLM 1.N.4.7

- **Number Clothesline:** Have a string clothesline in the math meeting space. Prepare number cards from 0 to 20—a 'tent' format works best. Place benchmark numbers (0 and 10; 0, 10 and 20; etc.). Have a few students take turns each day to put a card on the line and to explain their placement.

This can be used as a math routine.

BLM 1.N.4.8

0	10	20

Assessment for Learning

Record student responses to observe growth over time.

Performance Task: Class Number Book

Materials: large sheets of paper
markers
manipulative materials

Context:

Our class is going to make a number picture book. Each page will show how to represent one of the numbers from 1 to 20.

Have students work with a partner. Assign each group a different number from 1 to 20. (Each group will need to be responsible for more than one number.)

Provide a large sheet of poster paper and

a) have students use drawings, number sentences, materials (money, ten frames, base-10, counters, etc.) to represent each number. After the poster is complete use a camera to take a picture. The pictures can then be compiled into a class book.

or

b) have students draw and write the representations on the poster and compile the posters into a class book.

Set criteria with the class. Possible criteria might include

- defining the minimum number of representations expected
- the variety of representations
- the appearance itself (layout, print size, neatness, etc.)

Science Connection: Students can follow the design process from the science curriculum as they design their posters. Making a prototype first will allow for modifications (especially for option (b)) .

Notes

Grade 1: Number (1.N.5, 1.N.6, 1.N.8)

Enduring Understanding:

Quantities can be counted and compared using numbers, words, and numerals.

Essential Questions:

How can sets and numbers be compared and ordered?
How can you tell if one set is more or less than another set?

Specific Learning Outcome(s):	**Achievement Indicators:**
1.N.5 Compare and order sets containing up to 20 elements to solve problems using ■ referents ■ one-to-one correspondence [C, CN, ME, PS, R, V]	➛ Build a set equal to another set that contains up to 20 elements. ➛ Build a set that has more, fewer, or as many elements as another set. ➛ Build several sets of different objects that have the same number of elements in the set. ➛ Compare two sets using one-to-one correspondence, and describe them using comparative words such as “more,” “fewer,” or “as many.” ➛ Compare a set to a referent using comparative language. ➛ Solve a story problem (pictures and words) that involves the comparison of two quantities.
1.N.6 Estimate quantities to 20 by using referents. [C, ME, PS, R, V]	➛ Estimate a quantity by comparing it to a referent (known quantity). ➛ Select an estimate for a quantity by choosing between at least two possible choices, and explain the choice.
1.N.8 Identify the number, up to 20, that is one more, two more, one less, and two less than a given number. [C, CN, ME, R, V]	➛ Name the number that is one more, two more, one less, or two less than a given number, up to 20. ➛ Represent a number on a ten frame that is one more, two more, one less, or two less than a given number.

Prior Knowledge

Students may have had experience

- comparing quantities, 1 to 10
- constructing a set to show more than, fewer than, or as many as a given set.
- comparing two sets through direct comparison, and describe the sets using words such as “more,” “fewer,” “as many as,” or “the same number”

Background Information

In order for students to be able to make reasonable estimates they need to use a referent. A referent is a known quantity.

Mathematical Language

Comparative language:

more
fewer
as many as
the same as
less than
greater than
equal to one/two more than
one/two less than
set
estimate

Assessing Prior Knowledge: Class Observation

Show students a set of counters in the range 1–10. Ask:

- "Make a set that has as many counters as mine."
- "Make a set that has fewer counters than mine."
- "Make a set that has more counters than mine."

Ask students to describe the sets they have made.

Observation Checklist

The students are able to

- ❏ understand and use comparative language
- ❏ make a set equal to a given set
- ❏ make a set that is less than a given set
- ❏ make a set that is more than a given set

- **Build a set equal to another set that contains up to 20 elements.**
- **Build a set that has more, fewer, or as many elements as another set.**
- **Build several sets of different objects that have the same number of elements in the set.**
- **Compare two sets using one-to-one correspondence, and describe them using comparative words such as "more," "fewer," or "as many."**
- **Compare a set to a referent using comparative language.**
- **Solve a story problem (pictures and words) that involves the comparison of two quantities.**

- **Count and Copy:**

  Materials: a set of cards with dot representations for the numbers 1 to 20, 20 counters per student

  BLM 1.N.5& 6&8.1

  Directions: Work with a small group. Deal out one card face up to each student. Have the student identify the number shown and then replicate the arrangement of dots. Deal a new card. Have each student predict whether the new card has more, less, or the same number of dots as the previous card and then rearrange their counters to match the new card.

BLM
1.N.5&
6&8.2

- **More, Less, or the Same:**

  Materials: dot cards from Count and Copy BLM; spinner with the words more, less, and same, 25 counters per student

  Directions: Work with a small group. Place the cards face down. Turn over the top card. Have students identify the number shown. Spin the spinner to determine whether students will make a set that is more than, less than, or the same as the one shown.

- **Partner Match:**

  Materials: 20 counters per student, a file folder or book for a screen

  Directions: Students work in pairs with the screen between them. Each student places a chosen set of counters on their side of the screen. The screen is then removed and the sets compared. Have students predict which set is larger. Check using one-to-one correspondence. Record their results using more than, less than, or the same as.

  Example:

BLM
1.N.5&
6&8.3

Turn	Number in MY set	Number in my PARTNER'S set	My set had (more than, less than, or the same as) my partner
1			less than
2			more than

- **Number Display:** Select a number (e.g., 10) and put it in the middle of a bulletin board. Have each student fill a baggie with 10 objects. Try to have them use different objects. (Baggies could be filled at home.) Display the baggies on the bulletin board. Change the numbers and display frequently.

- **Draw and Compare:**

  "Draw a set which has 8 in it. Now draw a set which has *more/less* than 8."

  "Draw a set which has 12 in it. Now draw a set which is *equal/not equal* to 12."

  Use children's drawings of sets to introduce the terms *greater than* and l*ess than* for comparisons of sets.

- **Problem Solving:** Use real-world contexts for problems whenever possible (e.g., attendance—comparing the number of boys present (absent) to the number of girls; weather—comparing the number of sunny, snowy, cloudy, etc., days in a week/month).

Interview (record anecdotally or on a checklist)

1. Put 15 counters on a mat. Ask the student to put on another mat
   - an equal amount
   - a set with more
   - a set with less
2. Teacher and students each take a handful of counters, placing them on separate mats. Ask the students to count each set and to tell which mat has more and which has less. To explore students' reasoning, ask, "How do you know?"

BLM 1.N.5& 6&8.4

Paper-and-Pencil Task

Provide three sets of objects which are not equal and have students number them, in order, from least to greatest. Students write comparative sentences about them. (Provide a frame sentence initially. Children will print sentences without frames later.)

Frame sentence example:

There are more __________ than __________ and __________ .

There are less __________ than __________ and __________ .

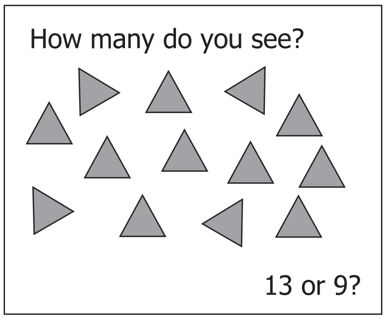
- **Estimate a quantity by comparing it to a referent (known quantity).**
- **Select an estimate for a quantity by choosing between at least two possible choices, and explain the choice.**

- **How Many?:** Place between 10 and 20 counters/cubes on the overhead projector. Turn the projector on for 5 seconds and then turn it off. Ask the students to write down their estimate. Turn the projector on and move 5 counters (referent) off to the side (but still on the screen). Tell students, "Here are 5 counters. Do you want to change your estimate? If you do will you change it to be more or less than your first estimate?" Ask students to explain their decision.
- **Estimation Jars:** Use three identical transparent containers. Fill one container. Use the other containers as referents (e.g., fill the first container with 16 blocks). Put five blocks in the second container and ten in the third. Have students use the referents to estimate the number of blocks in the full container.
- **Picture Estimation:** Find or create pictures of sets of objects. Show a picture and suggest two possible quantities. Have students make a selection and justify their choice.

- **Estimation Picture Book:** Have students
  - gather groups of classroom objects (between 5 and 20). Take a digital picture of the set, mount it, then have students identify two possible quantities or
  - use a computer draw program to create the page (LwICT connection)
  - use hand drawn pictures

Pages can be compiled into a class estimation book.

Example:



Observation Checklist

The students are able to

- ❏ use a referent to make reasonable estimates in the range
  - 1 to 10
  - 11 to 20
- ❏ select an appropriate estimate and justify their choice

Student Self-Assessment

Handfuls: Provide three different sets of objects such as cubes, colour tiles, or pattern blocks. Have students take a handful of one of the objects, estimate, and then count to check. Record results on the record sheet. Students can then self-assess indicating whether they thought their estimate was too small, just right, or too large. They can then set a goal based on their findings.

BLM 1.N.5& 6&8.5

Example:

Object	Estimate	Actual	My Estimate Was: (too small, just right, too large)
unifix cubes	15	16	just right
tiles	12	8	too large
pattern blocks	7	11	too small
Goal: I will try more activities so I know how much my hand can hold.			

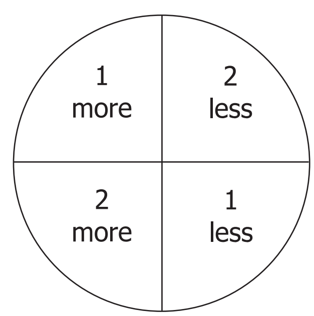
- **Name the number that is one more, two more, one less, or two less than a given number, up to 20.**
- **Represent a number on a ten frame that is one more, two more, one less, or two less than a given number.**

BLM 1.N.5& 6&8.6

- **Bucket Pull:**

  Materials: a container with numeral cards 1 to 20, a spinner or teacher-created die

  Directions: Spin the spinner to determine the game rule (e.g., give the number that is 1 more). Students take turns drawing a numeral card from the container, applying the rule and giving the new number.



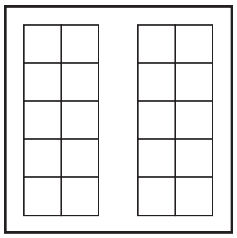
- **Ten-Frame Challenge:**

  Materials: a double ten-frame board and 20 counters for each student, set of ten-frame cards representing the numbers 0 to 20, spinner from Bucket Pull BLM

  Directions: Show students a ten-frame card and have them make the number shown on their ten-frame board. Spin the spinner. Before having students make the appropriate change on their boards ask them to predict the new number.

  Double Ten-Frame Board:

BLM 1.N.5& 6&8.7

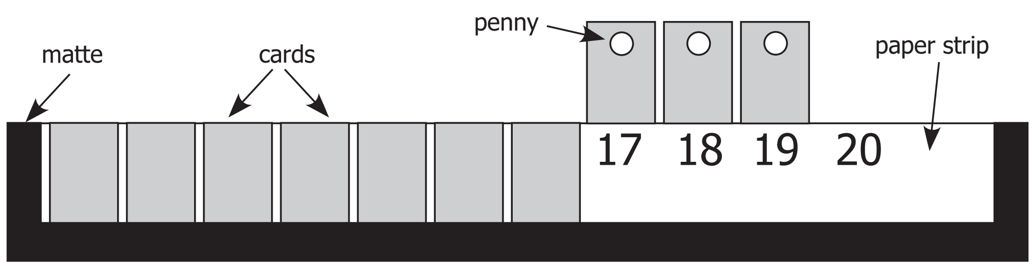


- **Hidden Numeral Boards:**

  Materials:

  - picture matting or heavy cover stock about 10 cm wide and 60 cm long
  - cards 6 cm x 9 cm
  - pennies or washers

  Tape the cards onto the matte with transparent tape so that the top is taped down and the card can be raised easily. On the underside of each card near the bottom, tape a penny or a washer. This helps to keep the card from flipping up.



Strips can be customized to meet student needs. **Hint:** When making a new number strip insert it into the numeral board and write the numbers in as you lift the flaps. This way the numbers will match up with the flaps.

Use the hidden numeral track to identify the number that is one or two more/less. Close the flaps (e. g., Lift one flap and point to the flap that is two away.). Have students predict the hidden number. Lift the flap to check.

Note: The Royal Canadian Mint has ceased the distribution of pennies to financial institutions. The penny will retain its value indefinitely. The penny is a representation for one. If you still have real or play pennies, use the penny to represent values and for counting. Pennies are a good support for counting and can be used to help build number sense.

Observation Checklist

Observe the students as they work on the suggested learning experiences. The students are able to identify the number that is

- ❑ one more than a given number
- ❑ one less than a given number
- ❑ two more than a given number
- ❑ two less than a given number

PUTTING THE PIECES TOGETHER

Investigation: I Have... Who Has...

BLM 1.N.5& 6&8.8

Materials: planning sheet BLM and markers
blank game cards
a sheet of ten-frame cards (0 to 20) reduced in size

Play a game of "I have… Who has…" with the class. After the game spread the cards out and have students help put the cards in order. Discuss the format.

Context

Our class likes to play "I have.. Who has…" games. I need your help to make some new ones.

Have students work in five small groups. Assign each group a game focus.

- Game 1—1 more than
- Game 2—1 less than
- Game 3—2 more than
- Game 4—2 less than
- Game 5—ten frame representations and a combination of ±1 or ±2*

* This game is more challenging to make.

The answer to the question on the first card is on the top of the second card, etc.

Set criteria with the class. Possible criteria might include

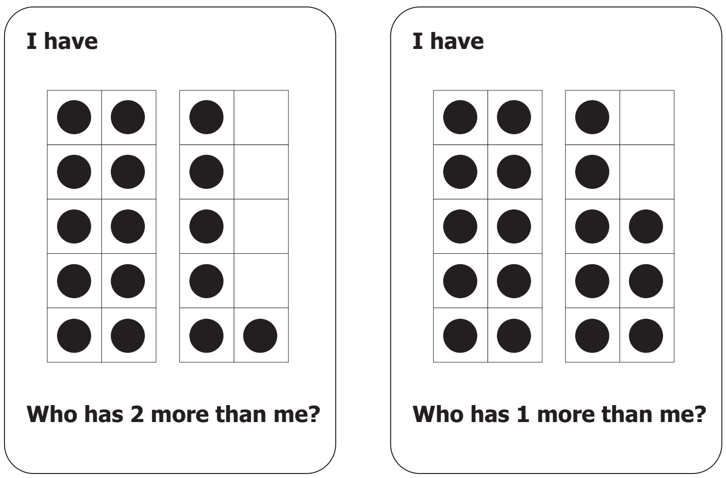
- number of cards in the game
- the answer to the question on the first card is on the top of the second card, etc.
- the answer to the question on the last card must be on the first card
- legibility/neatness

Students design their game on the planning sheet first before making their cards.

Questions to ask:

- How did you start your planning?
- How did you organize your work?
- Show me how your game works.

Sample card for Game 5



Grade 1: Number (1.N.7)

Enduring Understanding:

Quantities can be grouped in different ways.

Essential Questions:

How many ways can a quantity be grouped?

How many ways can a quantity be grouped so that there are no leftovers?

SPECIFIC LEARNING OUTCOME(S):	ACHIEVEMENT INDICATORS:
1.N.7 Demonstrate, concretely and pictorially, how a number, up to 30, can be represented by a variety of equal groups with and without singles. [C, R, V]	➛ Represent a number in a variety of equal groups with and without singles (e.g., 17 can be represented by 8 groups of 2 and one single, 5 groups of 3 and two singles, 4 groups of 4 and one single, 3 groups of 5 and two singles, and 1 group of 10 with seven singles). ➛ Recognize that for a number of counters, no matter how they are grouped, the total number of counters does not change. ➛ Group a set of counters into equal groups with and without singles in more than one way, and explain which grouping makes counting easier.

PRIOR KNOWLEDGE

Students may have had no formal experience with grouping.

Background Information

Sharing a quantity into groups of a particular size is called quotitive sharing. Sharing a quantity into a specified number of groups is called partitive sharing. Partitive sharing is the basis of division.

This outcome explores 'thinking in groups' which is an important prerequisite to understanding place value. As students explore different groupings they will discover that it is easier to count objects that are grouped in 2s, 5s, or 10s. They will also discover that there is less counting to do when using groups of 10.

Mathematical Language

groups
equal groups
singles
leftovers
remainder
sets

Learning Experiences

Assessing Prior Knowledge

Have a class discussion about sharing/grouping. Chart their ideas.

- **Represent a number in a variety of equal groups with and without singles (e.g., 17 can be represented by 8 groups of 2 and one single, 5 groups of 3 and two singles, 4 groups of 4 and one single, 3 groups of 5 and two singles, and 1 group of 10 with seven singles).**
- **Recognize that for a number of counters, no matter how they are grouped, the total number of counters does not change.**
- **Group a set of counters into equal groups with and without singles in more than one way and explain which grouping makes counting easier.**

- Read a story such as *Bean Thirteen* by Matthew McElligott , *A Remainder of One* by Elinor J. Pinczes, or *The Doorbell Rang* by Pat Hutchins. Have students act out the story using counters or beans.

  Give small groups of students each a different collection of counters/beans. Have students organize their materials into groups of 2, 3, 4, 5, etc. and record their findings on a chart.

  Example:

BLM 1.N.7.1

Our Number Is 21		
Group Size	**Number of Groups**	**Leftovers**
2	10	1
3	7	0
4	5	1

  As students are working ask questions such as

  - Before you group your counters into sets of ____ how many sets/groups do you think you will be able to make?
  - Do you think there will be leftovers?
  - Can you count your sets/groups for me?
  - Which groups were easier to count?

  Have groups share their findings with the class.

BLM
1.N.7.2

- **Grouping Game:** Play in partners.

Materials: a specified number of counters for each student
a (1 to 10) spinner or a 10-sided die

Directions: Player A spins the spinner or rolls the die. The student then groups his or her counters into sets of the number shown and counts the sets by the number shown. Any leftovers are removed. On Player A's next turn, he or she uses his or her remaining counters. The game continues until a player either runs out of counters or cannot do the grouping. For example

Player A starts with 30 counters.

1st turn—The player rolls a 9 and makes 3 sets/groups with 9 in each and counts "9, 18, 27." The leftover counters (3) are removed.

2nd turn—The player rolls a 5 and makes 5 sets/groups with 5 in each and counts "5, 10, 15, 20, 25." The leftover counters (2) are removed.

Observation Checklist

Observe students as they play the game.

Grade 1: Number (1.N.9, 1.N.10)

Enduring Understandings:

Quantities can be taken apart and put together.

Addition and subtraction are inverse operations.

Essential Questions:

How can symbols be used to represent quantities, operations, or relationships?

How can counting strategies be used to compare and combine numbers?

What questions can be answered using subtraction and/or addition?

Specific Learning Outcome(s):	**Achievement Indicators:**
1.N.9 Demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially, and symbolically by ■ using familiar and mathematical language to describe additive and subtractive actions from their experience ■ creating and solving problems in context that involve addition and subtraction ■ modelling addition and subtraction using a variety of concrete and visual representations, and recording the process symbolically [C, CN, ME, PS, R, V]	➛ Act out a story problem presented orally or through shared reading. ➛ Indicate if the scenario in a story problem represents additive or subtractive action. ➛ Represent the numbers and actions presented in a story problem by using manipulatives, and record them using sketches and/or number sentences. ➛ Create a story problem for addition that connects to student experience, and simulate the action with counters. ➛ Create a story problem for subtraction that connects to student experience, and simulate the action with counters. ➛ Create a story problem for a number sentence. ➛ Represent a story problem pictorially or symbolically to show the additive or subtractive action, and solve the problem. *(continued)*

Specific Learning Outcome(s):	**Achievement Indicators:**
1.N.10 Describe and use mental mathematics strategies, including ■ counting on, counting back ■ using one more, one less ■ making 10 ■ starting from known doubles ■ using addition to subtract to determine the basic addition and related subtraction facts to 18. [C, CN, ME, PS, R, V] Recall of one more and one less, complementary (compatible) numbers that add up to 5 and 10, doubles (up to 5 + 5), and related subtraction facts is expected by the end of Grade 1.	(It is not intended that students show their understanding of strategies using manipulatives, pictorial representations, and/or patterns when determining sums and differences.) ➛ Use and describe a mental mathematics strategy for determining a sum. ➛ Use and describe a mental mathematics strategy for determining a difference. ➛ Use and describe the related addition facts for a subtraction fact (fact family) (e.g., 6 – 4 = 2 has two related addition facts: 4 + 2 = 6, 2 + 4 = 6). ➛ Use and describe the related subtraction facts for an addition fact (fact family) (e.g., 2 + 3 = 5 has two related subtraction facts: 5 – 3 = 2, 5 – 2 = 3).

Prior Knowledge

Students may have had experience

- representing numbers from 2 to 10 in two parts (part-part-whole)

Addition, subtraction, and the equal symbols may not have been previously introduced.

Background Information

Part-whole understanding is ability to conceptualize a number as being composed of other numbers. It is one of the most important number relationships. For example, the number 8 is a whole amount but it is also made up of smaller groups 7 and 1, 2 and 6, 3 and 5, 4 and 4. Part-part-whole understanding provides a foundation for addition and subtraction.

To help students become efficient with computational fluency, students need to develop mental math skills and recall math facts automatically. Learning math facts is a developmental process where the focus of instruction is on thinking and building number relationships. Facts become automatic for students through repeated exposure and practice. When a student recalls facts, the answer should be produced without resorting to inefficient means, such as counting. When facts are automatic, students are no longer using strategies to retrieve them from memory.

There are many different types of addition and subtraction problems. Students should have experience with all types.

Addition				**Both + and –**
Result Unknown ($a + b = ?$)	**Change Unknown ($a + ? = c$)**	**Start Unknown ($? + b = c$)**	**Combine ($a + b = ?$)**	**Compare**
Pat has 8 marbles. Her brother gives her 4. How many does she have now? (8 + 4 = ?)	Pat has 8 marbles but she would like to have 12. How many more does she need to get? (8 + ? = 12)	Pat has some marbles. Her brother gave her 4 and now she has 12. How many did she have to start with? (? + 4 = 12)	Pat has 8 blue marbles and 4 green marbles. How many does she have in all? (8 + 4 = ?)	Pat has 8 blue marbles and 4 green marbles. How many more blue marbles does she have? (8 – 4 = ? or 4 + ? = 8)
Subtraction				
Result Unknown ($a - b = ?$)	**Change Unknown ($a - ? = c$)**	**Start Unknown ($? - b = c$)**	**Combine ($a - b = ?$)**	**Compare**
Pat has 12 marbles. She gives her brother 4 of them. How many does she have left? (12 – 4 = ?)	Pat has 12 marbles. She gives her brother some. Now she has 8. How many marbles did she give to her brother? (12 – ? = 8)	Pat has some marbles. She gives her brother 4 of them. Now she has 8. How many marbles did she have to start with? (? – 4 = 8)	Pat has 12 marbles. 8 are blue and the rest are green. How many are green? (12 – 8 = ?)	Pat has 8 blue marbles and some green marbles. She has 4 more blue marbles than green ones. How many green marbles does she have? (8 – 4 = ? or 4 + ? = 8)

Note: Addition and subtraction should be taught together. This will enable students to see the relationships between the two operations.

Mathematical Language

Operations:

addition	subtract
add	difference
sum	less
total	story problem
more	subtraction fact
subtraction	complementary (compatible)

Strategies:

counting on	making ten
counting back	doubles
one more	addition fact
one less	subtraction fact

Assessing Prior Knowledge

Materials: paper bag with 6 blue cubes and 4 red cubes

Present the following problem:

I have 10 cubes in my bag.

Some are blue and some are red.

Stop here and ask, "What cubes might I have in the bag?" Give student time to talk with a partner or small group. Record the responses on a chart or white board. Once all the combinations have been recorded give the last clue.

There are 2 more blue cubes than red cubes.

How many blue cubes do I have? How many red cubes?

Observation Checklist

Students are able to

- ❏ understand the problem
- ❏ apply their part-part-whole understanding to give all possible combinations
- ❏ understand and use appropriate vocabulary

- **Act out a story problem presented orally or through shared reading.**
- **Indicate if the scenario in a story problem represents additive or subtractive action.**
- **Represent the numbers and actions presented in a story problem by using manipulatives, and record them using sketches and/or number sentences.**
- **Create a story problem for addition or subtraction that connects to student experience, and simulate the action with counters.**

- Introductory activities: To ensure understanding of the processes of addition and subtraction, students need many experiences at each stage combining and breaking up sets. Use:
  - objects (e.g., counters)
  - pictures and words
  - numbers and words
  - numbers and symbols

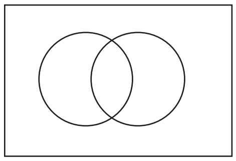
  Model the language for the operations and the symbols (+, — , =) used.
- Read a counting book such as *Ten Little Ladybugs* by Melanie Gerth for addition or *Ten Sly Piranhas* by William Wise for subtraction. Have students act out the story using counters. Reread the story and use pictures and number sentences to record the actions.

  Have students tell or write their own ladybug or piranha story problems.
- Model the telling of story problems. Have students orally tell story problems for other students to act out and answer. Story mats can be used for support.
- Use a story mat (e.g., a pond) and some counters (e.g., ducks) for each student. Present problem scenarios and have students act them out.

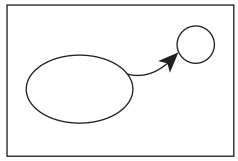
  Example:,
  - There are 3 ducks in the pond and 5 ducks on the shore. How many ducks are there altogether?
  - There are 10 ducks in the pond. Two ducks jump out. How many ducks are still in the pond?

- Read a series of story problems. Students decide whether the action is additive or subtractive. Have them fold their hands together to signify addition and hold their hands up and apart for subtraction. A double-sided card could also be used.

  Example:



Side 1: Addition



Side 2: Subtraction

- Have students make up their own story problems using a variety of real-life contexts (e.g., getting on and off the school bus, playing at recess, etc.).

- **Create a story problem for a number sentence.**
- **Represent a story problem pictorially or symbolically to show the additive or subtractive action, and solve the problem.**

- Give students a number sentence and have them make up a problem to match. Have them represent their problem in pictures or number sentences, and solve the problem.
- Prepare a set of story problems using pictures and/or words along with the matching number sentence for each problem. Mix up the problems and number sentences. Have students match the problem with the correct number sentence.

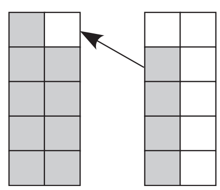
Assessing Understanding

Give each student a domino. Ask them to use the numbers on the domino to make up an addition and a subtraction story problem.

Problems can be shared with the class.

Mental Math

Note: The development of mental math strategies is greatly enhanced by sharing and discussion. Students should be given the freedom to adapt, combine, and invent their own strategies.

Strategy	Teaching Strategies
Counting on or counting back 4 + 2 student says **4**, 5, 6	■ Use a beaded number line. For example, for 7 + 3 slide the seven beads over as a unit and then move the remaining beads one at a time as students count on. For 14 – 2 slide the 14 beads as a unit and then remove one bead at a time as students count back. ■ Use a die labelled with the numbers 4 to 10 and one with pips showing 1, 1, 2, 2, 3, 3. Students roll the dice, say the number, and then count on the number of pips.
Using one more or one less 12 + 1 = ____ 14 – 1 = ____	■ Connect to forward and backward counting. ■ Use a number line and a hundred chart to help students see the pattern.
Making 10 9 + 4 = ____	■ Use a double ten frame to help students visualize the strategy. For example, when adding 9 + 4 students can see that moving one from the 4 to make 10 makes adding easier. This is a practical application of part-part-whole understanding. Eventually students will be able to show the steps without the ten frames.  $9 + 4 =$ $\underbrace{9 + 1}_{} + 3$ $10 + 3 = 13$
Starting from known doubles	■ Have students brainstorm things that come in twos (pairs). Record their suggestions. Include pictures to support the vocabulary. ■ Read a book such as *Double the Ducks* by Stuart J. Murphy or *Two of Everything* by Lily Toy Hong. Have students represent the actions in the story using a double ten frame mat. ■ Fold small rectangular pieces of paper in half. Use a hole punch to punch a small number of holes. Ask students to predict what they will see when the paper is unfolded. Unfold the paper and have students describe what they see. Have students make their own doubles cards.
Using addition to subtract	■ **Note:** Thinking addition is an efficient strategy for subtraction. Teaching addition and subtraction at the same time helps students to see this relationship between the operations. For example, for 9 – 5, think “5 and how many more to make 9?” (5 + ___= 9)

- **Use and describe a mental mathematics strategy for determining a sum.**
- **Use and describe a mental mathematics strategy for determining a difference.**
- **Use and describe the related addition facts for a subtraction fact (fact family) (e.g., 6 – 4 = 2 has two related addition facts: 4 + 2 = 6, 2 + 4 = 6).**
- **Use and describe the related subtraction facts for an addition fact (fact family) (e.g., 2 + 3 = 5 has two related subtraction facts: 5 – 3 = 2, 5 – 2 = 3).**

- Strategies should be posted in the classroom and revisited on a regular basis.
- Prepare a set of addition and subtraction problem cards. Have students select a card and identify a strategy that could be used to find the answer. The cards can then be placed under/or above that strategy heading.

Assessing Understanding

Use this opportunity to make anecdotal notes on the strategies students are using.

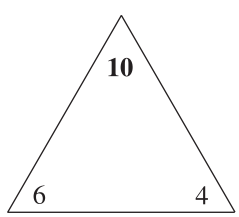
- Use different number frames to help develop the relationship between addition and subtraction (fact families). For example, Use a "7" frame to work on fact families for 7.

BLM 1.N.9& 10.1

Students can see that 5 + 2 = 7, 2 + 5 = 7, 7 – 2 = 5 and 7 – 5 = 2.

- **Triangular Flashcards:** Use triangular flashcards to support fact family relationships. The relationship shown depends on which corner is covered. For example, If the 10 is covered students can give the addition number sentences 6 + 4 = 10 and 4 + 6 = 10. If the 6 is covered they can give the number sentences 10 – 4 = 6 or 4 + __ = 10.

BLM 1.N.9& 10.2



- A series of math fact games, activities, and centres can be found in the mathematics group on <www.maple4teachers.ca>. Look under the K–4 Math Resources Wiki.

Assessing Understanding

Strategy Sort: Give students a set of addition and subtraction problem cards and strategy cards. Have them sort the problem cards under the strategy headings. Ask students to tell how they would use the strategy to arrive at the answer.

Give students numerals and have them write the related number sentences.

Putting the Pieces Together

Performance Task: Writing Problem Books

Have students work with a partner.

Tell students that they are going to write problem books for the class. Assign three fact family numbers to each group. Have students write a set of problems that use the three numbers.

Set criteria with the class.

Possible criteria:

- 2 addition problems (pictures can be included)
- 2 subtraction problems (pictures can be included)
- all problems should ask a question
- a number sentence and the answer for each problem should be written on the back of the problem or under a flap

Have the problems shared with the class.

Books can be placed at the math centre for others to read and solve.

N OTES